



AeroSilento – a new high quality supply of air or vacuum in laboratory



To supply vacuum or compressed air, e.g. for the aeration of fermenters and bioreactors in biotechnological laboratories not equipped by central air and vacuum lines, LAMBDA has developed an innovative, microprocessor controlled, compact and virtually noiseless air compressor and vacuum pump – the LAMBDA AeroSilento.

There are hundreds of air compressors and vacuum pumps available on the market. However, when an oil-free, compact, low pulsation and very quiet pump is required, the choice becomes limited.

The LAMBDA AeroSilento uses the scroll pump principle based on an almost unknown mechanism using two spirals. One spiral is stationary while the other rotates around the first one. This movement generates a series of closed compartments with gradually decreasing volume and increasing pressure. The transport of gas or liquid is smooth and progressive. Additionally, the multiple mechanical closures through the contact of both spirals results in a very good pressure stability. This means that the final pressure does not decrease with the flow rate, as it is usual in other pump types. The scroll principle was invented about one hundred years ago. However, it could not be produced without the use of modern, numerically controlled machines.

The scroll-pump system has been selected because of its inherent high-quality features:



- operates without oil
- low pulsation
- extremely low noise level (comparable to a PC)
- long lifetime
- excellent flow and pressure stability
- can be used as compressor as well as vacuum pump
- very small dimensions

Technical properties

Max. air flow rate:	5 l/min
Max. pressure:	0.2 MPa
Output pressure regulation:	from 0 to 0.2 MPa
Vacuum:	4 kPa (0.04 atm)
Power supply:	100 to 240 VAC/50-60 Hz, 150 W
Noise level:	29 dB
Dimensions:	15 x 16 x 30 cm (W x H x D)
Weight:	4.5 kg



OPERATING INSTRUCTIONS

Use of the LAMBDA AeroSilento as an air compressor

The setup of the LAMBDA AeroSilento is very easy:

- Connect the tubing to the air output hose barb on the rear of the AeroSilento and to the tubing barb of the instrument or recipient to be supplied with the compressed air (e.g. to the air input hose barb on the back of the LAMBDA MINIFOR laboratory fermentor-bioreactor).
- Switch the power on with mains switch at the rear of the pump.
- Use the knob to set the desired pressure. Rotate clockwise to increase the pressure.
- When the pressure is higher than desired turn the pressure control knob counter-clockwise until the desired pressure appears on the display. The speed of the motor will automatically be adjusted to the actual flow rate.



Do not exceed the maximum pressure of 0.2 MPa (or 2 atm) !



The LAMBDA AeroSilento is not constructed for work with corrosive, explosive or flammable vapors.

Use of the LAMBDA AeroSilento as a vacuum pump

The LAMBDA AeroSilento can also be used as an efficient low noise vacuum pump. In this case, connect the tubing to the air input hose barb at the front of the instrument. Disconnect the tubing from the air output hose barb at the rear of the AeroSilento low noise air compressor.

The air stream should pass through a low temperature condenser or similar device, thus eliminating the vapors in the gas stream. This will prevent the formation of condensate in the pump and a possible corrosion inside the pump.

Elimination of condensate

Because of the compression-expansion process, liquid water regularly forms in the pump and must periodically be removed. The pump is so light that it is possible to remove the condensate easily:

1. Take the air tubing away from the air output hose barb at the rear of the AeroSilento pump.
2. Set a low pressure by rotating the pressure control knob counter-clockwise.
3. Switch on the pump and lift the pump by hands with the front part up.
4. Place the output hose above any convenient bucket. If any condensate is present, it will now flow out. When no more condensate is coming out, place the pump into the horizontal position, switch off the pump and restore the previous tubing connection.

Peltier Air Drying System (Peltier cooling trap)

The Peltier humidity condensing system protects the LAMBDA MINIFOR laboratory fermenter-bioreactor against water condensation in the air flow-rate measuring and control system, particularly in the Massflow cell and needle valve. Such a protection is even more important in hot and humid environments.

The air drying system (cooling trap) consists of

- Peltier electro-thermal cell, which generates cold (no water cooling system is therefore necessary). The temperature of the cool side is electronically controlled to about +4°C. This prevents freezing of condensed water and blocking of the air way. A small LED on the front of Peltier unit shows when the current is switched on and off. The cable of Peltier cell is connected to the corresponding socket on the rear of the AeroSilento air compressor.
- Condenser tube, where the input air passes along metal cooling finger on which the water vapor condenses and drops into the condensate bottle
- Condensate bottle, which is made of pressure resistant chemical glass. The stopper carrying air input and lower part of condenser input tube is screwed to the condensate bottle. The condensate bottle must be protected from shocks and must be kept in the protective stand.
- Protection stand safely holds the condensate bottle in vertical position and protects against flying pieces of glass in case of an accidental breakage of glass. The openings in the shield allow seeing how much water has accumulated. Empty the bottle when necessary.



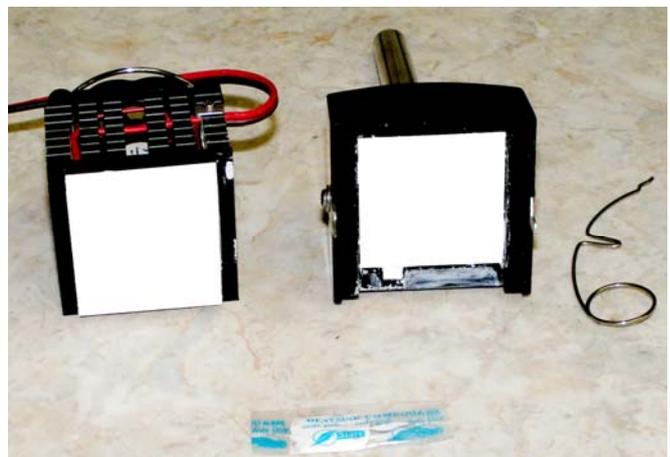
Always remove the pressure before manipulation with condensate bottle!



The condensate bottle functions also as a pulsation damping device, which stabilizes the air pressure downstream before entry into the MINIFOR fermenter. When the pressure fluctuation should be critical, additional pressure resistant vessels can be added into air stream.

Setting up the air drying system:

1. Spread heat conducting paste regularly on the metal contact plate of the cooling finger (right). This paste is common heat conducting paste used in electronics and can be obtained in electronics shops.
2. Place the Peltier unit (left) on this layer and by small movements spread the paste regularly over the cooling surface. This should eliminate air between contact surfaces.



3. Fix both parts together by the spring wire (left).
4. Screw the assembly to the condenser tube (right).



5. Connect the input of the condensate bottle to the air output at the rear of the AeroSilento compressor and secure it in place.
6. Connect similarly the output of condenser tube to the MINIFOR air input by tubing. (Using the supplied silicone tubing 5 mm OD with wall of 1 mm you protect your instrument from overpressure and also increase pressure-damping capability.)
7. Put the condensate bottle into the protection stand.



8. Connect the Peltier cooling trap to the corresponding socket on the rear of the AeroSilento air compressor.
9. Switch the power switch of the AeroSilento on.
10. Set the desired pressure by turning the pressure selection knob.
11. The display indicates the pressure in kPa. The maximal preset pressure value is limited to 199 kPa (setting: 1.99).



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